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Influence of silane type and application time on the bond strength to leucite reinforced ceramics

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extract and green tea may be used as an alternative to delay the restorative procedure due to their potential as reversers of these adverse effects [2]. This study aims to assess the influence of different antioxidant agents on the bond strength of restored bleached teeth.
Materials and methods: The present study was approved by the Ethics Committee of Instituto Universitário Egas Moniz. Fifteen human permanent molars were sectioned into identical halves that were randomly distributed between five groups ($n = 6$): unbleached control group (CG), bleaching + resin composite bonded immediately (G1), bleaching + sodium ascorbate (G2), bleaching + grape seed extract (G3) and bleaching + green tea (G4). G1, G2, G3 and G4 were bleached for 4 h/day for a 7-day period. After bleaching, G1 samples were immediately restored with an adhesive system and a resin composite, in G2 samples a 10% sodium ascorbate gel was applied, in G3 a 5% grape seed extract and in G4 a 5% green tea, all applied for 15 min. After these antioxidants, G2, G3 and G4 were immediately restored. After 24 h, samples were sectioned in order to obtain 1.0 (± 0.3) mm^2 microspecimens. The microspecimens were tested in a universal testing machine at a speed of 0.5 mm/min. Data were analysed by using a two-way ANOVA, at a significance level of 5%.
Results: G1 group (bleaching only) recorded the lowest mean bond strength value (9.5 (± 1.2) MPa) and it was significantly lower than the control group (CG) (19.3 (± 2.7) MPa) ($p = .001$). Groups in which sodium ascorbate (G2) (19.2 (± 1.3) MPa), grape seed extract (G3) (16.5 (± 0.8) MPa) and green tea (G4) (16.7 (± 2.0) MPa) were applied presented significantly higher bond strength values when compared to bleaching only (G1) ($p < .001$). When comparing the antioxidant agents, G2 (10% sodium ascorbate) exhibited significantly higher mean bond strength values when compared to G3 (5% grape seed extract) ($p = .016$).
Discussion and conclusions: Treatment of the enamel surface with antioxidant agents such as sodium ascorbate, grape seed extract and green tea following the bleaching procedure and immediately before the restorative procedure can reverse the compromised bond strength. These alternative strategies are effective and may be used instead of delaying the procedure.

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Influence of silane type and application time on the bond strength to leucite reinforced ceramics

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ABSTRACT
Introduction: All-ceramic restorations currently dominate the market of indirect restorative materials due to their biocompatibility, longevity and superior aesthetics [1]. Silica-based ceramics, such as leucite, carry the advantage of being receptive to surface treatments, making them bondable to tooth substrates [2]. However, a standardised application protocol regarding silane coupling agents is lacking. Such step is critical to ensure durability of the restoration placed *in situ*. Post-etch cleaning and silane application have been proven to increase bond strength, however, this step varies for each material [3]. The aim of this research was to assess the influence of different types of silane coupling agents and respective application times on the bond strength of the ceramic-resin interface.
Materials and methods: Ten leucite reinforced glass ceramic blocks (IPS Empress CAD LT BL4/C 14) were divided into equal halves. Of the samples obtained, 6 were randomly divided into three groups according to the silane used: **G1** BIS-Silane (Bisco, Schaumburg, IL, USA); **G2** ESPE Sil Silane Coupling Agent (3 M ESPE AG, Seefeld, Germany); **G3** Monobond Plus (Ivoclar-Vivadent, Schaan, Liechtenstein). Each was then divided into two subgroups, according to the surface conditioning time: **T1** (1 min.) or **T2** (5 min.). Each block was acid etched (HF 9.5% − 1 min), post-etching cleaned (OPA 37.5% − 1 min; ultrasonication − 2 min.) and silanized. Heat treatment was carried out at 100 °C (1 min.). Then a thin layer of Optibond FL (Kerr) adhesive was applied and each block was adhered to pre-heated resin at 55 °C. The samples were light cured for 40 s on each side (1200 mW/cm^2). Samples were sectioned into microspecimens (1 ± 0.2 mm^2) that were subjected to aging (10,000 thermocycles − 5 and 55 °C). The microspecimens were tested in tension at a crosshead speed of 0.5 mm/min, until they debonded. Data analysis was carried out by a two-way ANOVA, at a significance level of 5%.

Results: The group featuring BIS-Silane with longer application time (G1T2) presented a mean μTBS value (32.4 ± 19.6 MPa) significantly higher to all other groups ($p < .001$). Monobond Plus registered the lowest mean μTBS value (G3T1 − 18.5 ± 7.3 MPa) and (G3T2 − 17.3 ± 5.8 MPa). The type of silane coupling agent has shown to have a significant influence on the microtensile bond strength ($p = .001$; $\eta^2 = 0.16$).
Discussion and conclusions: Some authors have previously suggested that silanization could benefit from longer application times, but seldom research has been found featuring this variation protocol [3,4]. Silanes require a hydrolysation process in order to establish chemical bonds. Two-bottle systems show the highest bond strength results and may benefit from longer application times. The addition of 10-MDP seems to have no significant advantage over traditional silane coupling agents.

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Low-level laser therapy in neurosensory recovery – case series in dental and maxillofacial rehabilitation

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ABSTRACT
Introduction: Neurosensory disorders may be considered as a complication from surgical procedures, such as dental implants and mandibular osteotomy [1–3]. In these cases, the orofacial damage can involve general and professional patient impairments. Low-level laser therapy (LLLT) has been reported to be effective in reducing neurosensory recovery time, while promoting nerve regeneration [4,5]. This study aimed to analyse the LLLT impact on postsurgical neurosensory recovery, namely for dental and maxillofacial surgery patients.
Materials and methods: Patients previously submitted to dental and/or maxilofacial rehabilitation at Centro Hospitalar Universitário de Coimbra/Faculty of Medicine, University of Coimbra, were selected. Anamnesis, examination and neurosensory evaluation were performed to determine the presence and location of neurosensory disorder. The elected orofacial area was irradiated using a continuous wave diode laser at 660 nm (SIROLaser Blue; Sirona, Bensheim, Germany) in two sessions per week, until satisfactory results were achieved. The measure of health-related quality of life was performed by EQ-5D-5L questionnaire, before and after the LLLT treatment. This study was approved by the ethics committee of Faculty of Medicine of the University of Coimbra and the informed consent document was performed.
Results: Two patients (both Female, Age 22) were selected. Treatment lasted approximately 1 months in both cases. The mean score before and after treatment (0–100 scale), of the EQ-5D-5L questionnaire was 70.0–95.5.The recovery of the neurosensory disorder allowed the quality improvement in all 5 dimensions: mobility, self-care, daily activities, pain/discomfort and anxiety/depression. No reactions or side-effects were reported.
Discussion and conclusions: 5 dimensions of health quality were analysed and the severity level degrees were related with the corporal/patient impairment. The results supported the use of LLLT as an effective treatment option by accelerating the recovery of postsurgical neurosensory disturbances, improving the patient's health.

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